CHAPTER ONE

INDUSTRY TRENDS AND REVIEW

In 1978, the Federal government deregulated the commercial airline industry within the U.S. Since this event, many communities throughout the country have experienced notable changes in their commercial airline service. As the number of airlines providing service has decreased and the industry has experienced further consolidation of its remaining carriers, many smaller commercial service markets have witnessed declining levels of service. Scheduled commercial airline service is important to communities throughout Arizona. Commercial airline service is important to Arizona not just because it provides Arizona residents and visitors with safe and efficient transportation, but also because commercial airline service is an essential underpinning to Arizona's economy.

Recognizing the importance of commercial airline service to the State, the Aeronautics Division of the Arizona Department of Transportation undertook this study to help smaller and rural communities throughout Arizona to gain a better perspective of their air service needs and opportunities. The study contains information that is essential to understanding what is happening in the airline industry, and it provides insight on how these trends have impacted air service at the airports being examined in this study. Through surveys, meetings, and other diagnostic efforts, information on each airport and its associated service area is also detailed. Results of this study's diagnostics efforts are used to estimated each study airport's ability to attract and increased level of boarding or enplaning passengers, and these estimates of demand are in turn used to analyze each airport's ability to support improved or new commercial airline service. Results of this study can be used by the Aeronautics Division and individual communities throughout Arizona to develop and implement appropriate action plans related to improving commercial airline service.

While the international airports serving both Tucson and Phoenix have significant levels of scheduled commercial airline service, the focus of this analysis was on smaller communities in Arizona that now have commercial airline service as well as a selected number of other communities that may have the potential to support commercial airline service. Airports serving Bullhead City/Laughlin, Flagstaff, Grand Canyon, Kingman, Lake Havasu City, Page, Prescott, Safford, Sedona, Show Low, Sierra Vista, Winslow-Holbrook, and Yuma were the focus of this analysis. Arizona's statewide air service study is documented in this as well as seven additional chapters which comprise the study's technical report.

While each state has its own individual air service environment, Arizona's population distributions and concentrations, its geography, and its heavy dependence on tourism all combine to make Arizona's air service environment unique. With the vast majority of the State's enplaning passengers are using either Tucson or Phoenix, the State's smaller and rural communities are faced with challenges not experienced in other states. As a result of its unique air service environment, national trends in the aviation industry may have less of a propensity to influence near term air service in Arizona. The following sections provide a discussion of trends that are anticipated in the

aviation industry; while this discussion is divided between major/national and regional/commuter airlines, because this study is focused primarily on small and rural communities in Arizona, the trends in the regional/commuter industry have the most direct applicability to the markets being analyzed.

The purpose of this chapter is to provide an overview of the commercial airline industry, relate these trends to existing conditions in Arizona, and review previous studies that have been conducted to address Arizona air service issues.

1. AIRLINE INDUSTRY TRENDS

In preparing a comprehensive air service analysis for the smaller commercial service airports in Arizona, it is important to have a general understanding of recent and anticipated trends in the aviation industry as a whole. When these trends are considered, it is important to review factors that have and could impact the commercial airline service in Arizona. Some trends will undoubtedly have a more profound impact on Arizona than others; and, in fact, it is possible that some trends that are anticipated and discussed in this chapter may have no pronounced impact on the State's commercial aviation environment. For this discussion, the trends in the commercial airline industry are segregated between those for the major/national carriers and those that are anticipated for the regional/commuter airline industry.

A. Major/National Air Carrier Trends

The Airline Deregulation Act of 1978 changed the face of commercial passenger air service upon its implementation. Prior to Deregulation, the Civil Aeronautics Board (CAB) awarded routes to air carriers and established the fares which these airlines could charge. In order to ensure that airlines would not suffer financial losses, the CAB balanced among the carriers the award of profitable, less profitable, and unprofitable routes. Airline routes, which were largely point-to-point, were often times granted with the condition that the carrier make stops at one or more under-served airports, thus ensuring air service to smaller communities. Hence, prior to Deregulation, many smaller communities that are now served exclusively by regional/commuter carriers, or that may have lost service altogether, were served by large commercial jet aircraft.

Once the CAB was dissolved, airlines were no longer ensured financial stability, and the carriers were free to serve the city pairs of their choice. With the advent of Deregulation, the airlines undertook a near-universal adoption of the hub-and-spoke route structure. Hub-and-spoke systems were thought to be better than the linear route systems that were in place before Deregulation. Airlines utilizing the hub-and-spoke system transport passengers from smaller "spoke" airports to larger "hub" airports, after which passengers are "sorted" and board flights to their final destination. This approach increased load factors and increased airline revenues.

Once the hub-and-spoke system became the dominant route structure, airlines began serving smaller markets with smaller aircraft. On unprofitable routes, many airlines left markets entirely, thus allowing the void to be filled by the growing number of regional and commuter carriers entering the industry. At many connecting hubs, airlines increased their share of passengers to the point that they became the dominant carrier at the airport; these airports became know as "fortress" hubs. Until the mid-1980s, the number of airline connecting hubs in the United States increased. However, due to various market forces, airline operating strategies during the 1990s changed. Airline connecting hubs such as Continental's in Denver and American's hub in Nashville were closed as the airlines attempted to reorganize and streamline their activities to achieve higher profits.

Prior to Deregulation, routes were often times awarded to ailing carriers in order to keep them afloat financially. Once this safety valve ceased, a rash of mergers, acquisitions, and bankruptcies occurred which served to consolidate the airline industry. This included the acquisition of Western by Delta, Republic by Northwest, Air Cal by American, Ozark by TWA, Frontier and People Express by Continental, Piedmont and PSA by US Airways, and Morris Air by Southwest. The net result of the hub-and-spoke system, along with airline merger/acquisitions, has been fewer commercial airline opportunities for all airports.

Most recently, domestic carriers in the U.S. have shown tendencies toward further consolidation as Continental and Northwest have forged a strategic alliance and similar alliances have been discussed by Delta and United and American and U.S. Airways. While the final effects of such alliances have yet to be determined and experienced, further consolidations in the airline industry could portend fewer opportunities for new air service for all air travelers with the U.S., including those using Arizona's commercial airports.

This further consolidation in the airline industry also decreases the likelihood that additional airline connecting hubs will be established by the nation's domestic carriers. While the hub and spoke concept works basically the same for states that are in the East versus those that are in the West, there are some essential differences, and these differences impact Arizona's current air service patterns as well as its air service opportunities. The vast majority of the major connecting hub complexes are located east of or at least in close proximity to the Mississippi River. This gives communities in the East, of a size similar to those in Arizona that are being analyzed in this study, more opportunities for obtaining service through a number of connecting hubs operated by different airlines. For example, because of geographic proximity, it would not be uncommon for a market in either West Virginia or Virginia to have connecting service through Cincinnati and/or Atlanta (Delta); Charlotte and/or Pittsburgh (US Airways); and Washington Dulles (United).

For communities in states located in the West, the number of connecting hub opportunities are more limited. While Sky Harbor International serves connecting traffic, the percentage of connecting passengers served at this airport versus those that fall into the origination/destination (O&D) category is lower than the percentage found at more

traditional connecting hubs. At the larger connecting hubs, between 65 and 75 percent of all enplaning passengers may be connections, and the airline serving the hub may account for upward of 90 percent of all the market's available seats. While the airlines serving both Phoenix and Las Vegas do serve a notable number of connecting passengers, they are not as hub-dominant as airports such as Cincinnati, Minneapolis, and Charlotte, because the activity at both airports is distributed among a greater number of airlines.

The closest true connecting hubs to the Arizona markets being analyzed in this study are those located at Salt Lake City and Denver. Hubs located in Dallas and Houston are beyond the range of turboprop aircraft from the Arizona markets, but could be reached by new regional jets. These aircraft will be discussed later in this section. Los Angeles also serves some connecting traffic, especially for international destinations and markets which lie along the West Coast. The hub-and-spoke system operated by most carriers is not expected to change. Hence, this service pattern will continue to influence the near term air service opportunities for communities throughout Arizona. Since much of Arizona's current airline service is tied to service provided via connecting hub airports, in particular Phoenix, and the establishment of new hubs is not envisioned, it is likely that Arizona's commercial air service patterns will not undergo radical changes in the near term.

Until recently, seats per departure for the major/national carriers remained fairly stable. The FAA forecasts seats per departure to increase slightly each year. This is due largely to the phase-out of aircraft which do not meet Stage III noise standards. Between January 1, 1995, and January 1, 2000, Stage II aircraft must either be modified to meet Stage III noise standards or be retired. Waivers may be granted to airlines which have at least 85 percent compliance by July 1, 1999, and can demonstrate firm orders for modification or replacement of their remaining Stage II aircraft. Such waivers, however, expire on December 31, 2003. Much of the Stage II aircraft fleet consists of narrow-body aircraft, including:

Manufacturer	Aircraft Type	Typical Seating Capacity
Boeing	727-100/200	112/145
	737-100/200	90/110
McDonnell Douglas	DC-9-10/30/40/50	73/100/104/122

Many of the Stage III aircraft replacing those in Stage II have larger seating capacities. These Stage III aircraft include:

Manufacturer	Aircraft Type	Typical Seating Capacity
Boeing	737-300/400/500/800	131/139/108/164
	757	186
McDonnell Douglas	MD-88/90	140/149
Airbus	A320	149
Fokker	F100	98

The Air Transport Association (ATA) reports that its members at the end of 1997 had nearly 80 percent Stage III aircraft in terms of their operating fleets. U.S. airlines that are members of ATA have commitments (orders or options) to purchase some 2,432 new aircraft. These aircraft are expected to be delivered at a rate of 225 to 275 new aircraft over the next five years. Several new wide-body aircraft with larger seating capacities have been introduced into the U.S. fleet. These include the Boeing 777, McDonnell Douglas MD-11, and the Airbus A330 and A340. The FAA projects average seats per aircraft on domestic routes to increase from 142.6 in 1997 to 165.2 by 2008.[1]

It is important to note that while larger aircraft are on the drawing boards or in production for several aircraft manufacturers, it is anticipated that many of these aircraft will see no or only limited domestic use and that they will be used to serve only the high volume markets. This industry trend is not anticipated to have any impact on scheduled commercial airline service in Arizona.

According to the FAA, domestic passenger enplanements are expected to increase from over 540 million in 1997 to 821.5 million by 2009. When international enplanements are considered, this figure is projected to exceed 924 million enplanements. According to data published by ATA, enplaned passengers carried by major/national airlines within the U.S. grew 2.9 percent between 1996 and 1997, increasing from 530.7 million to 546.2 million. During this same period, enplaned passengers carried by U. S. airlines to international destinations grew by 4.4 percent, increasing from 50.5 million to 52.7 million. At the same time, according to ATA, the number of actual departures by the major/national airlines operating in the U.S. declined by almost one percent. The increase in enplanements combined with the decrease in departures lead to the average load factor for all domestic airlines reaching an all time high in 1997. ATA data indicates that the average load factor for the major/national carriers has climbed steadily between 1987 and 1997, increasing from 62.3 percent to a reported 70.4 percent in 1997. While traffic has grown steadily, airline

[1] Federal Aviation Administration, *FAA Aviation Forecasts-FY 1998-2009*, March 1998.

passenger yields, the amount collected by the airlines to fly one passenger one mile, increased by less than 1.0 percent to 13.1 cents. This increase was less than the 2.3 percent increase reported for the Consumer Price Index for 1997.

In the deregulated airline environment, any state's commercial airline service is influenced first and foremost by its level of demand for such service. The demand for commercial airline service can be and is influenced by many factors. These factors include the state's total population and the demographic composition of that population; total employment and the type of employment that is predominate in the state; the level of disposable income that is available to residents in the state; and other factors such as tourism that bring visitors to the state. While there is an inherent level of demand for commercial airline service in any state and in each of its communities, how and where that demand for commercial airline travel is actually served depends on a number of factors. In particular, competition from airports both within and beyond Arizona that have more significant levels of commercial airline service or offer more competitive fares can cause Arizona airline travelers to leave their local market area and depart from a more distant commercial service airport either within or beyond the State.

In today's air service environment, it is not uncommon to find passengers associated with one market driving to a more distant airport to initiate their commercial airline travel. Sometimes this passenger diversion occurs among airports in the same state and sometimes the diversion is to airports beyond the state in question. In association with this study, surveys were undertaken to identify and measure current passenger diversion for each of the Arizona markets being studied. This type of information allows each community to have an understanding of its unconstrained demand for commercial airline service, as well as an understanding of its competition and the factors that contribute to passenger diversion from each individual market in Arizona. While many states experience an outflow of passengers from their smaller markets to airports which are beyond the state, a significant percentage of the passenger diversion from the smaller markets in Arizona is to larger airports within the State. Las Vegas is the only out-of-State airport in proximity to markets in Arizona that is within a reasonable driving time. Actual results of the survey efforts to measure and quantify current passenger diversion in each of the study markets is documented in a separate section of this report.

B. Regional/Commuter Carrier Trends

While a great deal of consolidation has occurred among the major/national carriers, another segment, the regional/commuter carriers, has flourished. As previously mentioned, after Deregulation, major/national carriers were replaced by regional/commuter carriers in many markets.

Once the hub-and-spoke system was fully established, major airlines began depending on regional/commuter carriers to provide traffic feed. At first, this was in the form of interline

agreements whereby the major/national and regional/commuter carriers could easily accept tickets from one another. Eventually, these arrangements evolved into code sharing agreements, offering passengers single ticketing, short connecting times, and close gate proximity between flights. At first, regional/commuter airlines were independently owned. However, with the establishment of connecting hub complexes, carriers began to realize the benefits of such alliances. Thus, a growing trend in the industry has been for major/national airlines to acquire an equity interest in their code-sharing partners, sometimes even purchasing them outright.

According to the FAA, in recent years, the growth of the regional/commuter market has outpaced that of the major airlines. This trend is projected to continue, as major airlines transfer many short-haul routes to their regional partners. In conjunction with this trend, regional/commuter aircraft manufacturers are continuing to introduce larger, more technically advanced aircraft into the marketplace. Many of these aircraft offer amenities found on larger jet aircraft, including stand-up cabins, food and beverage service, and lavatories. One such aircraft, the Canadair Regional Jet (CRJ), is a 50 passenger jet aircraft. Based on the prevalence of larger commuter aircraft, such as the CRJ, the national average for the number of seats per departure for regional/commuter carriers is expected to increase during the planning period.

It is anticipated that the regional airline component of the airline industry will continue to be one of the most dynamic. The well-established process in which the major airlines have favored longer-range routes and denser markets and have contracted with regional carriers for their short haul operations is anticipated to continue. The impact of regional jets and their continued acquisition by the regional carriers is also anticipated to continue to change the airline industry as the competition between carriers operating these smaller jets becomes more intense.

According to FAA forecasts, between 1997 and 2009, passenger enplanements for regional/commuter carriers are expected to increase from 61.9 million to 117.0 million; average passenger trip length is expected to increase from 227.3 to 287.0 miles; seats per departure are expected to increase from 31.2 to 40.3; and the average load factor is expected to increase from 53.1 percent to 58.2 percent. Since the smaller regional jets are capable of flying stage lengths well in excess of 1,000 nautical miles, this aircraft will provide additional point-to-point and/or connecting air service opportunities that have not previously been available.

Airlines that fall into the regional/commuter classification carry about 11 percent of the nation's commercial airline passengers, and this percentage is growing. Of the 782 airports in the U. S. that have scheduled commercial airline service, according to estimates from the Regional Airline Association (RAA), over 70 percent of these airports depend exclusively on service provided by regional/commuter carriers. There is no doubt that the success of the

regional/commuter segment of the airline industry is largely related to their affiliation or code-sharing with their major/national partners. In fact, in 1996 (the most recent year for which data is available from RAA), over 95 percent of all passengers who traveled on a regional/commuter airline traveled on one that code shares with a major/national partner.

While the number of passengers flying on regional/commuter carriers has grown from 28.4 million in 1986 to 62 million in 1996, the number of regional/commuter aircraft in service increased from only 1,806 to 2,127 in this same period. This attests to the industry's propensity to use aircraft with larger seating capacities to serve its customers. Increasing seat size among carriers in the regional/commuter category is a trend that will undoubtedly impact commercial airports in the coming years. While aircraft that fall into the 19-seat category continue to be the most prevalent type of regional/commuter aircraft in operation, this, according to RAA forecasts, is expected to change. According to RAA there are over 560 aircraft in the 19-seat category in operation today, and they expect this figure to decline to fewer than 175 aircraft by 2007.

RAA sees the regional/commuter airline industry moving away from turboprop aircraft and into the jet age. RAA projects that over 75 percent of the regional/commuter aircraft that are ordered between now and 2007 will fall into the jet category. Regional/commuter jet aircraft are expected to fall into three categories. One is the regional jet, such as the Canadair Regional Jet (CRJ), seating 50 passengers. The other two categories, according to RAA, will be the Large Regional Jet (LRJ) which will seat 70 or more passengers and the Micro Jet (MJ) which will seat between 33 to 37 passengers. If all regional jets that are in the planning stages come on-line by 2007, over half of the regional/commuter aircraft, according to RAA, will be jets. This will enable the average stage length flown by regional/commuters to increase from 230 statute miles to over 400 statute miles by 2007. This estimate for average stage length by RAA exceeds that of the FAA, emphasizing RAA's belief that regional jets will dominate the fleet by 2007.

RAA anticipates that as smaller aircraft are retired, the regional/commuter airline role will shift from serving smaller communities to primarily one of feeding the mega-carrier systems at the hub airports. RAA indicates that while they anticipate that regional/commuter operations will expand, the number of points (cities) served by regional/commuter airlines may actually decrease. With the switch to jet aircraft by many of the larger/regional carriers, there will be, according to RAA, a surplus of 19 to 30-seat aircraft available. Within the industry, there is some debate as to exactly what will happen to these surplus aircraft. Some envision that another tier of carriers will emerge to provide service to the smaller cities that cannot support even the smallest of the regional jets. While others, including RAA in their annual report, indicate that the emergence of a new class of carriers does not appear likely. This conclusion is based largely on the assumption that mega-carriers will be unwilling to forge alliances with carriers who fly small aircraft once the trend to the regional jets has fully manifested itself. This trend has the potential to impact commercial service points in

Arizona. There are several carriers discussing potential start-up commercial airline service to some of Arizona's smaller markets; most of these carriers are proposing to use 19-seat or smaller aircraft. Carriers such as Sunrise Airlines who is already operating at Show Low and Page will most likely being flying as non-code sharing airlines. The fact that these start-up carriers who will be operating smaller aircraft will not have code sharing arrangements with major airlines has the potential to impact passenger travel in the markets that they serve. These potential impacts will be discussed in the sensitivity analysis which will be presented in Chapter 8 of this report.

C. Impact of Trends on Arizona

This section provides an overview of some of the specific trends in the aviation industry that may have a pronounced impact on commercial airline service in Arizona in the near term. As noted, one of the most prevalent trends in the commercial airline industry today relates to the diversion of passengers from smaller markets to larger markets which offer levels of commercial airline service which are perceived as being superior. One of the primary reasons cited for passenger diversion by travelers throughout the U.S. is airline fares. While market specific diversion rates for the communities being analyzed in this study are discussed elsewhere in this report, a notable portion of the passenger diversion from Arizona's small and rural markets occurs to other larger airports within the State (i.e., Phoenix and Tucson airports).

Data from the U.S. Department of Transportation (U.S. DOT) for the calendar year ending in 1997 sheds light on one of the primary factors responsible for intrastate passenger diversion. Data from the U.S. DOT groups airports throughout the U.S. by three categories: large, medium, and small hub. For each category of airport, U.S. DOT also publishes average fare data by stage length of the trip. While Sky Harbor International Airport falls into the large hub category, Tucson International falls into the medium hub category. For almost all reporting categories, fares at both Phoenix and Tucson were below the national average for all stage lengths. As an example, for the large hub category, the national average one-way fare for stage lengths in the 250 to 499 mile range is $106; the average one-way fare for Phoenix for this stage length is $56. For stage lengths between 1,500 and 1,999 miles, the average fare nationally is $193, while the average fare at Phoenix is $169. One of the reasons why the average fare at Phoenix is consistently below the national average relates to the percentage of the market that is made up of flights by low fare carriers. Nationally, for the large hub airports, an estimated 12 percent of their flights are flown by carriers that fall into the low fare category; at Phoenix, the percentage of the market flown by low fare carriers approaches 33 percent. While the percentage of flights by low fare carriers at Tucson International Airport is below the national average for medium hub airports, average fares by stage length are still below the national average for most categories. For example, while the average fare for the 250 to the 499 mile stage length nationally is $83, the average fare from Tucson International for this stage length is $53. In the 1,500 to 1,999 mile stage length, the average fare from Tucson, $207, is above the national average for all medium

hub airports; the average fare nationally is $174. Since the primary reported factor for causing diversion from smaller to larger markets across the U.S. is fares, it is not surprising that smaller and rural markets in Arizona experience a significant amount of passenger diversion to the State's larger commercial service airports.

As noted, growth in the regional/commuter segment of the commercial airline industry is expected to outpace those carriers in the major/national category. The recent signing of a long-term code-sharing agreement between Mesa Airlines and America West has the potential to positively influence commercial airline activity in the State. Under the new agreement, Mesa will provide feeder service to America West under the America West Express banner. The new agreement also calls for Mesa to acquire 11 additional 37-passenger and 10 additional Canadair Regional Jets (CRJs) by 1999.

Mesa has indicated that its CRJs and its larger 37-seat Dash 8 turboprop aircraft will replace some of its 19-seat Beech 1900 aircraft, but they have not officially announced a decision to completely remove the Beech 1900 from their fleet. The Dash 8 is currently being used in Flagstaff and Yuma, while the Beech 1900 is being used in the remaining Arizona markets served by Mesa (Bullhead City, Lake Havasu City, Sierra Vista, Prescott, and Kingman). As indicated in the discussion of national trends in the regional/commuter airline industry, RAA anticipates a drastic curtailment of the use of turboprop aircraft on an industry wide basis. With its recently signed agreement with America West, it is likely that Mesa Airlines will be a key player in providing service to Arizona's small and rural communities in the foreseeable future. Mesa has indicated that the FAA's imposition of Part 121 rules on regional carriers has made it harder for regional carriers to make a profit operating smaller aircraft such as the 1900. Nevertheless, according to Mesa officials, they plan to keep operating turboprop aircraft in niche markets; many of Arizona's small and rural markets fall into this category.

Growth within the airline industry, especially the regional/commuter segment, does present possible air service opportunities for Arizona markets. For example, National Airlines (a new entrant carrier that is seeking to secure adequate financial backing before filing for DOT certification) plans to begin serving many major markets from Las Vegas using B-757 aircraft. If the airline is successful, a Connecticut-based firm has already announced plans to form a regional carrier to provide feeder service to the new entrant at Las Vegas. The markets in the West have seen the preponderance of the start-up carriers that have initiated service in recent years. The continuance of new entrant carriers and the possible start up of regionals to feed the new entrants presents possible opportunities for Arizona's small and rural communities for gaining new commercial airline service. Perhaps the biggest drawback to such new service, however, is the fact that new entrant regionals in the West (i.e., Aspen Mountain Air, Mountain Air Express, and Air 21) have showed only limited staying power. When carriers enter and then quickly exit a market, travelers become skeptical about the reliability of other similar carriers when they enter the market. Reliability of service is highly rated by all consumers when they make their selection for a departure airport.

Air service in Arizona's small and rural markets is also influenced by the Essential Air Service (EAS) program. Arizona is one 17 states that has multiple cities whose commercial air service is subsidized by the EAS program. The EAS program is funded by the Airport and Airways Trust Fund. The program was initiated to help stabilize service in small communities throughout the U.S. that would have otherwise lost service following deregulation of the airline industry. Service to Kingman, Prescott, and Page is subsidized through the EAS program. It is important to note, that on a per passenger basis, the EAS subsidies in Arizona are among the lowest in the nation. Scenic Airlines is the current service provider to Page; Sky West previously provided service in the market. A Utah-based carrier, Sky West recently announced that it will sell the assets of air-tour based specialist Scenic Airlines to Las Vegas-based carrier Eagle Canyon Airlines. Eagle Canyon has an option to acquire two Beech 1900s that are used by Scenic to fly EAS routes to Page and Ely, Nevada. Sky West has indicated that it does intend to also sell the Page tour operation with two Twin Otter aircraft and several single-engine planes.

While the Federal government has implemented reductions in the EAS program and has discussed its elimination, the program continues to survive. As air service options are reviewed as part of this study, it will be important to determine the ability of communities now receiving operating subsidies to support service which is economically viable and thus independent of any type of operating subsidies.

2. PREVIOUS AIR SERVICE STUDIES

In addition to reviewing how airline industry trends are anticipated to affect commercial airline service within Arizona, previous air service studies conducted for Arizona airports were reviewed. Although these studies do not dictate the analysis conducted in this study, they did provide background information for consideration in the analysis for Arizona's commercial air service needs. These studies are discussed in the following sections.

A. Flagstaff Marketing Package

In February 1998, The Boyd Group/ASRC conducted an analysis on the revenue opportunity for Sky West/Delta Connection service on a route from Flagstaff to Salt Lake City. As the regional airport for northern Arizona, Flagstaff, according to the Boyd Airport, represented a significant opportunity for Sky West/Delta Connection to access an economically growing area within substantial tourism. After reviewing the traffic and revenue potential for Flagstaff, The Boyd Group/ASRC analysis indicated that service utilizing Canadair Regional Jets with three round trips daily to Salt Lake City could generate over 76,000 annual passengers. Based on an average yield of $0.23 per mile, service would generate nearly $7 million in net new revenues for the Sky West/Delta Connection system.

Results of the studies and inquiries done by The Boyd Group showed that Northern Arizona University and Ralston Purina are major economic forces in the community that have a

strong potential to generate more outbound traffic. Northern Arizona University generates approximately 2,600 round trips per year. Due to Flagstaff's history of unreliable commercial air service, these users send large portion of their passenger traffic to Phoenix for airline departures. It was estimated as part of the Boyd study that up to 80 percent of this passenger leakage to Phoenix could be stopped by providing viable service from Flagstaff. In 1997, Ralston Purina generated 170 round trips. It was noted that most of their passengers traveling to Phoenix could be recaptured with reliable jet service at Flagstaff Pulliam Airport.

Local Flagstaff travel agency surveys conducted as part of the Boyd analysis indicated that only 25 percent of their clients were booking flights from Flagstaff, while the vast majority of the other 75 percent use Phoenix. The strongest factor influencing the traveler's decision to travel from Phoenix was price, with the second and third factors being flight reliability and reduced flight frequency at Flagstaff. Business travel accounted for 35 percent of all travel, while leisure travel account for the remaining 65 percent. A large number of the agents expressed support for new regional jet service to another hub, particularly Salt Lake City or Denver.

Flagstaff's enplanement levels rose 20 percent from 1995 to 1997 due to economic growth. This indicates that in spite of the previous service problems with America West Express, the economic growth of the area could support additional air service options. The Boyd Group estimated that Sky West jet service to a Salt Lake City hub would tap into this growth and result in more than 38,000 annual enplanements.

At the time of the Boyd analysis, current traffic flows indicated that over 62 percent of Flagstaff annual traffic was to the Southwest or West. It appeared that service to the East would be greatly improved and traffic patterns would be distributed more evenly throughout the U.S. with Sky West/Delta Connection to the Salt Lake City hub. The amount of traffic leaking from Flagstaff was analyzed to determine the number of passengers that could be captured by Sky West/Delta Connection. It was estimated that approximately 250,000 annual passengers are being lost to Phoenix. Approximately 50 percent of this leakage was determined to be fare-driven, therefore, considered unrecoverable. The remaining 125,000 passengers were redistributed among the top Flagstaff markets and assessments were made about the capture of traffic that could be obtained from each top market. This analysis identified over 61,000 new passengers annually that could be carried by Sky West/Delta Connection, along with approximately 15,000 annual passengers using America West Express to Phoenix who would be attracted by this new jet service. It was determined that Sky West/Delta Connection could recapture over 49 percent of the current passenger leakage that is not fare-driven.

The Boyd Group projected revenue potential by assuming an annual traffic level of 76,439 passengers at a yield of $0.23 per seat mile with a stage length from Flagstaff to Salt Lake

City of 390 miles. This would yield $6,856,581 in total annual revenue. The Boyd Group's analyses indicated a load factor in excess of 74 percent could be realized.

The analysis concluded that the Flagstaff/Northern Arizona Region is part of a growing economic area that is a viable market for Sky West/Delta Connection. The City of Flagstaff is highly supportive of a new carrier and is prepared to assist Sky West/Delta Connection in marketing new service.

In July 1998, The Boyd Group also prepared passenger and revenue forecasts for the Los Angeles/ Flagstaff market. Forecasts indicated that the Flagstaff market is a great opportunity for Sky West/United Airlines with 44,920 passengers annually, $8,926,363 in revenue, and a load factor of 68 percent. Forecasts were developed on the following assumptions: a 30-seat Embraer EMB-120 Brasilia aircraft, three daily roundtrip flights, United code-share only, reasonable levels of connectivity with existing United Airlines flights at Los Angeles, and no measurable load restrictions. Results of this forecast suggested potential demand does exist for this market and that there is a sufficient population base for Sky West to establish air service from Los Angeles to Flagstaff. This service would be as an option to the previously discussed Salt Lake service.

B. Commuter Air Service Feasibility Study

In 1981, the Commuter Air Service Market Feasibility Study observed that "the high costs of fuel, equipment, and labor, and the subsequent high fare structure, has resulted in a cutback in the number and frequency of flights in the smaller markets. This has led to lower passenger demand. With the departure of regional and trunk carriers, replacement service has come via the commuter air carriers."

This study forecast commuter service demand and identified 14 routes that had the ability to break even by 1986. Of these 14 proposed routes in the 1981 study, only four had commercial service in 1987. The remaining 10 were not being served due to lack of demand and lack of airline interest in serving these routes.

In 1988, TRA Airport Consulting prepared a Commuter Air Service Feasibility Study to provide the State of Arizona with a computer model which could be used to assess the market potential for commuter air service between two cities and determine the costs associated with specific routes. At that time, commuter service was provided from Phoenix and Tucson to Flagstaff, Lake Havasu, and Yuma. With the exception of the Grand Canyon, this left the northeast and east portion of the State without service. Five cities were eligible for funding from the Essential Air Service Program, though only four, Page, Kingman, Prescott, and Winslow, actually received subsidies at the time of the 1988 study. The FAA viewed Flagstaff, the fifth city, as having sufficient ability to support unsubsidized service. The computer software developed as a part of this study was used to assist planners in

evaluating whether the same routes identified in 1981 could be implemented successfully in 1988, or if they remained unprofitable based on certain parameters.

The existing airport system was analyzed and it was determined that there were 256 airports in Arizona, of which 81 are public use and 175 private use. These airports were classified by the type of air service they provided to the community and the type of aircraft they could accommodate. The status of existing routes was presented along with FAA summaries of the EAS impact to each city. An air travel survey helped to determine business travel patterns, top destinations, and important service factors such as aircraft model, ticket price, and schedule. These surveys were distributed to businesses in 26 Arizona cities via chambers of commerce. These 26 specific cities were surveyed because they had been identified in the 1981 study as candidates for commuter air service. Survey results concluded that Los Angeles was the primary out-of-state destination for 14 of the 17 Arizona cities that returned surveys. Of the 26 Arizona cities examined, Phoenix was the primary destination for nine (9) of the 17 cities. The primary factors, according to the surveys that characterized good service were schedule convenience, followed by ticket price, and aircraft type. Based on the results of the survey and other information, it was concluded that the East Central and the Clifton-Morenci/Safford-Thatcher areas, two populated regions of Arizona, were not being served by commuter aircraft.

The last portion of the study focused on the financial feasibility of air service for specific routes. A spreadsheet program that measured the costs of various commuter aircraft against the costs of driving the equivalent route in an automobile was developed. The purpose of this computer program was to determine the minimum passenger volume necessary for the smallest commuter aircraft and the most appropriate aircraft to serve a route for a given level of passenger demand. Input data to the program included personal driving costs and aircraft block hour costs. The program first determined cost per block hour time, then annualized it. Annualized aircraft costs were then compared with equivalent annualized driving cost. This resulted in a series of appropriate commuter aircraft that could profitably serve a route, given the chosen parameters.

C. Four Corners Commuter Air Service Study

In an effort to improve the quality of the Four Corners Regional air service, the Region's Commission funded the Commuter Air Service Study that was conducted between June 1978 and June1979. It had been recognized that improved air service in smaller communities was needed. The study was conducted by Landrum and Brown and monitored and assisted by the Utah Department of Transportation.

The Four Corners Region is comprised of communities in Arizona, Colorado, Nevada, New Mexico, and Utah. This region, at the time of this prior study, was noted to be the fastest growing area in the United States. As the economy and population of many small

communities in the region grew, so did the need for reliable commuter service. Inconvenient schedules, poor on-time performance, and financial losses contributed to unreliable service within the area. The problem the study addressed was how the system could be improved to sufficiently handle the present and future commuter air service demand. The study contained four phases, including an Inventory, Demand Assessment, Presentation, and Service Alternative phase.

The main purpose of the Inventory stage was to collect economic, demographic, and aviation data for use in other study phases. Information was collected from aircraft manufacturers, state coordinators, federal agencies, and community representatives. Communities and airports in the Region were visited, and officials discussed the aviation-related problems in their communities. The economic and demographic characteristics of each community were studied and documented as well.

The Demand Assessment Phase was essential to provide a clear understanding of the factors impacting commuter air service demand and also aided in identifying solutions to aviation problems. Enplanement demand in the Four Corners Region was found to be a function of the areas's remoteness from a major air carrier airport; community income, population, and economic base; and the popularity of the area as a tourist destination.

The Presentation and Improvement Phase examined the existing situation and future growth projections. This enabled the study team to identify and analyze existing problem or potential problem areas. This process involved discussions, presentations, and briefings with airline, state, and local officials.

The Service Alternative Phase analyzed the economic benefits of air transportation and examined the service prospects with and without governmental action. A detailed route analysis was performed to determine the relative profitability of individual routes. Findings, conclusions, and recommendations were discussed in the latter portion of the study. It was determined that the overall commuter air service route development process in the Four Corners Region had not been well coordinated. This resulted in an underdevelopment of the region's air transportation system.

Based on the findings and conclusions, recommendations for improving the air service quality in the region were developed. The first recommendation, labeled as the Communications Improvement Plan, would improve the level of communications between state, local, and airline officials. This would be made possible by each community appointing a community air transport coordinator, who would assist appropriate state and local officials in a determination of aviation facility needs. Airlines would institute an effective market awareness/public affairs program that would help educate community leaders on the benefits associated with air, versus ground transportation, and they would work with these leaders in the development of facility plans and public transportation

requirements. The five states in the Four Corners Region would develop state aviation organizations that would be responsive to state and federal regulatory issues and market requirements.

The other recommendation, the Community Air Service Action (CASA) Program, contained three different elements. The first element included holding the Four Corners Regional Commission responsible for the institution, overall administration, and evaluation of the program. The second element was that the community would work through its air transportation coordinator, who would be responsible for eliminating community-related problems that hindered the development of air service in their respective community. The third element consisted of the Four Corners Regional Commission selecting communities and routes that had been proven profitable and beneficial, and using them as part of the air service demonstration project.

These recommendations were aimed at eliminating many of the problems associated with the introduction of air service; improving the communications network between state, local, and airline officials; and developing a complete understanding of the route development process in the Region. Implementation of the recommendations presented in this study were expected to aid in the establishment of an efficient and high quality commuter air service system in the Four Corner Region.

3. SUMMARY

The industry trends and review of previous studies provide a backdrop for actual technical analyses that will be conducted in subsequent elements of the study. Information from industry trends and previous studies will be considered as markets being considered in this study are analyzed and recommendations for improving commercial airline service are developed later in this study. It is worth noting that while Flagstaff continues to work on implementing recommendations from its recent air service study, in-state service opportunities identified in the State's prior commuter air service study as well as recommendations contained in the Four Corners Air Service Study have remained largely unimplemented.